

REMARKS

For convenience, the matters raised in the Office action are discussed below in the same order as presented by the Examiner.

In reply to paragraphs 1 and 2 of the action, a substitute specification is submitted together with a marked-up copy showing the changes that have been made in the original specification. The substitute specification does not contain new matter.

For completeness, it is noted that the substitute specification corrects the error noted at page 9 in paragraph 1 of the action. Also, the blurred or illegible words at pages 5 and 10 of the application, as noted in paragraph 2 of the action, have been corrected.

As indicated, claim 25 has been cancelled. Upon cancellation of claim 25, all of the remaining pending claims depend directly or indirectly from independent apparatus claim 1 or independent apparatus claim 20. The pending claims are, therefore, characterized by the use of a divergent nozzle, electrostatic charging, and a slot between the drawing assembly and diffuser for delivery of air by a venturi effect. It is the combination of these features or elements that achieve the spreading of the filaments and provision of a more homogeneous nonwoven web having improved properties. The cooperation of these features is demonstrated in the accompanying Declaration of Olivier

Guichon. Mr. Guichon is an employee of Rieter Perfojet, the assignee of this application.

Test 1 of the Declaration corresponds with the invention in that the filament bundles are opened and distributed through the cooperative action of the diffuser divergent zone, electrostatic charging and the venturi effect. Tests 2, 3 and 4, respectively, delete one of electrostatic charging, the venturi effect, or the divergent zone as shown in the table at the middle of page 2 of the Declaration. The remaining operating parameters are identical in order to enable comparison of the test conditions.

It remains applicants' position that there is no suggestion in the prior art for the combination of the claimed diffuser and electrostatic charging. Accordingly, there is no motivation for the proposed combination of teachings upon which the claims are rejected. Heretofore, the art has separately employed diffusers and electrostatic charging devices for purposes of opening filaments. The cited art is representative of this prevailing practice.

Even if it is assumed that the teachings of the references are combined, the improvements achieved in accordance with the invention are unexpected and evidence the patentability of the claimed arrangement. This is shown by the test results of the Guichon Declaration as discussed below.

Herein, Test 2 is representative of the teachings in US patent 5,460,500 to Geus et al. That is, Test 2 includes an arrangement having a venturi effect and a divergent diffuser construction. As shown, this arrangement has a machine direction tensile or MD strength of 45N and a cross direction tensile or CD strength of 22N. Similarly, US patent 5,397,413 to Trimble et al. corresponds with the arrangement of Test 4, and has a MD strength of 24N and a CD strength of 15N. The improvements achieved in accordance with the invention are shown by comparison with the results of Test 1, and may be numerically summarized as follows.

Percent Improvement By Invention Combination

Technique/Test No.	Strength (N)	% Difference (Test 1- Test X)/Test X
Invention Test 1		
MD	45	---
CD	25	---
Geus '500 Test 2		
MD	26	73.1
CD	22	13.6
Trimble '413 Test 4		
MD	24	87.5
CD	15	66.7

Machine direction strength is important in the handling of the nonwoven fabrics or webs with automatic machines. That is, the MD strength should be sufficient to enable the web to be handled in roll form and trained through the machine for further processing without undue breakage.

In accordance with the invention, the MD strength improvements are in the order of 70% to 80% as compared with the Geus et al. and Trimble et al. prior art teachings. It is submitted that improvements of such magnitude are improvements in kind, not mere degree, and are indicative of invention. That is, the additional filament separation and other orientation achieved by the combination of treatments in accordance with the invention is not a mere additive result of the separate processing techniques.

Accordingly, even if the combination of references is assumed, *prima facie* obviousness is rebutted by the unexpected improvements achieved in accordance with the invention. Again, the magnitude of the improvements of the invention are substantial and indicate improvements in filament orientation distinguishable from a mere change in degree of arrangement. The data demonstrate that applicants have discovered a significant improvement for which they are entitled to patent protection.

Each of the three features of the claimed invention are required to achieve all of the desired nonwoven properties. That is, elimination of anyone on the three features on the invention will result in an undesirable nonwoven characteristic.

For example, even though Test 3 appears to provide reasonable mechanical properties, it results in an unacceptable variation in weight distribution. Particularly, the weight distribution in respect to Test 3 exceeds 5%.

Lastly, it is shown that all three features or elements of the present invention are required to achieve evenness properties characterized by a uniform web substantially free of defects in the nature of holes or cloudiness or aligned or married filaments. The evenness results show that only Test 1 provided a substantially defect-free nonwoven construction.

Samples of each of the nonwoven materials provided in accordance with Tests 1, 2, 3 and 4 are attached to the Declaration. A visual inspection of these test samples readily confirms the superior uniformity of Test 1 in accordance with the invention.

For completeness, it is noted that US patent 4,820,142 to Balk is of a structure similar to that in Geus et al. and may be included within the comparison of Test 2. However, it should be appreciated that Balk provides a diffuser shaft

6 that only includes a divergent zone. That is, the divergent zone on the diffuser is located directly below the stretching gap 5. This is shown in Fig. 1 and confirmed in claim 1 of the patent which recites:

1. An apparatus for making spun-filament fleece comprising ...

a stretching gap downstream of said cooling shaft; a diffuser shaft downstream of said gap; ...

respective measured values form setpoint values.

Accordingly, the diffuser 6 does not include a convergent zone as set forth in all of the claims of record.

It is respectfully submitted that the invention provides an unusual and surprising combination of improvements. That is, all three aspects or features of the invention must be present to achieve improvements in mechanical properties, uniformity of weight distribution and evenness of filament arrangement within the web.

The Declaration evaluates and compares the present invention with the closest prior art and rebuts even an assumed combination of the teachings. Here, it is shown also that each aspect of the invention is necessary, and that together they provide improvements not achieved if any one of the aspects is not present.

There is no reason or basis in the prior art to expect that all three elements or aspects of the claimed apparatus and method are required in order to achieve the improvements of the invention. This is not a case involving result effective variables. In fact, there is no prior art teaching or suggestion of the relationship between the variables and the improvements, and certainly, no teaching or suggestion that the combination of variables are necessary to each of the improvements.

The present invention, therefore, provides an unusual and surprising result or improvement sufficient to overcome an assumed obvious combination of prior art teachings. In measuring the sufficiency of the improvement, the Federal Circuit suggested the following tests in *In re Sernaker*, 702 F. 2d 989, 217 USPQ 1 (Fed. Cir. 1983):

- a) whether a combination of the teachings of all or any of the references would have suggested (expressly or by implication) the possibility of achieving further improvement by combining such teachings along the line of the invention in suit, and
- b) whether the claimed invention achieved more than a combination which any or all of the prior art references suggested, expressly or by reasonable implication.

Here, there is no suggestion of the possibility of achieving further improvement along the line on the invention. That is, the necessity of the three aspects of the present invention is never suggested by the art, especially not in respect to mechanical strength, weight distribution and evenness. It is not plausible to project such improvements without some specific guidance from the prior art, and such guidance is not provided herein. In a like manner, the claimed invention achieved more than a combination which any or all of the prior art references suggested, expressly or by reasonable implication. There is no suggestion in the prior art, and it is not plausible to speculate, that the inventive improvements in mechanical properties, weight distribution and evenness will arise from the three aspects or features of the claimed invention. Accordingly, applicants have demonstrated sufficient improvements to overcome the rejection of the claims.

As noted above, all of the pending claims are limited to the divergent diffuser, electrostatic charging and venturi effect features or elements shown to be necessary in the Guichon Declaration. Accordingly, all of the claims presently of record are in condition for allowance and such action is requested.

There is submitted herewith a Supplemental Information Disclosure Statement, together with the required fee for the same.

If there are any further fees required by this amendment not covered by an enclosed check, or if no check is enclosed, please charge the same to Deposit Account No. 16-0820, Order No. 34051.

Respectfully submitted,

By: 
Joseph J. Corso, Reg. No. 25845

1801 East Ninth Street
Suite 1200
Cleveland, Ohio 44114-3108

(216) 579-1700

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